# 5.0 Preliminary Assessment

## 5.1 Aquatic Life Use Assessment

Currently, aquatic life designated use assessments are based on benthic macroinvertebrate data. Based on 1998 data, 3 of 17 (17.6%) of benthic macroinvertebrate monitoring sites were not impaired and the remaining 14 of 17 (82.4%) were moderately impaired. This represents a decline from 1990 conditions. In 1990, 10 of 14 (71.4%) sites were not impaired and 4 of 14 (28.6%) were moderately impaired. In general, the factors that influence benthic macroinvertebrate communities include water and sediment quality, habitat quality (e.g., substrate, canopy, etc), hydrologic conditions (e.g., stream flashiness, storms, drought, etc.), natural conditions (e.g., recent hatch).

Review of water quality data in WMA02 indicates few or no exceedences of SWQS criteria for conventionals and metals. Habitat quality was optimal or suboptimal at 16 of 17 stations; only 1 station exhibited marginal habitat and no station exhibited poor habitat quality. This direct evaluation is limited because benthic communities may be affected by chemicals in water or sediment that were not detected or perhaps not monitored. The habitat quality assessment was based on a compilation of many habitat factors. In addition, it was not possible to evaluate hydrologic or natural conditions with available data. Interpretation is also confounded by small sample size (17 stations) and because only 3 of 17 were not impaired, leaving a very small data set to characterize unimpaired locations.

Despite these limitations, land use and land use change may provide useful information regarding general environmental disturbances that can affect benthic communities. Figure 5.1-1 and Table A5.1 are useful to evaluate the relationship between AMNET and land use. These data were provided courtesy of Mr. Mark Ayers of the Long Island New Jersey NAWQA Program. Some general observations from this dataset include:

- 3 of 3 unimpaired locations have small drainage areas; most but not all moderately impaired locations have larger drainage areas
- 3 of 3 unimpaired locations have optimal habitat scores; moderately impaired locations have optimal, suboptimal and 1 marginal habitat scores
- unimpaired locations have large percentages of forest and wetland, less urban land. However, 1 or more moderately impaired locations had similar characteristics to unimpaired locations.
- Most moderately impaired locations were adjacent to or just downstream of urban development, potentially indicating the importance of proximal effects.

In order to better evaluate the many potential causes of benthic impairment, NJDEP and USGS are cooperatively conducting a study over the next 2 years: "Development of Watershed Indicators and Realistic Stream Restoration Goals". This study will include advanced statistical and spatial analyses using many datasets to identify factors that contribute to benthic impairment. Many factors that will be considered, including point sources, golf courses, lake outlets, contaminated sites, landfills, stream flow, habitat quality, water quality, sediment quality, etc. The Department is also exploring other indicators to use in combination with benthic macroinvertebrate data to better characterize the health of aquatic systems, including fisheries

and algal indicators. In addition, field investigations by NJDEP and watershed partners are expected to lend additional insight into factors that contribute to impairment.

## 5.2 Recreational Use Assessment

Currently, recreational use assessments for streams consider fecal coliform data collected 5 times per year. Based on the 1995-97 data reviewed for this report, the streams sampled for fecal coliform do not support swimmable uses. In addition, 1998 data reviewed for TMDL planning also indicate lack of support for swimmable status, although data are considered preliminary because only 5 samples available for the assessment. See Appendix A3.6-2 for additional information.

Currently, recreational uses in public lakes are evaluated using trophic status, since eutrophic conditions may interfere with swimming, boating or fishing. The two public lakes evaluated in WMA 02 were classified as eutrophic, although available data were not considered sufficient to include these lakes on List 1- Confirmed Impairment in the 1998 Impaired Waterbodies List. See Appendix A3.6-1 for additional information.

Recently, NJDEP began working with state, county and local health agencies to compile lake bathing beach data. These data will provide a more direct assessment of recreational uses for swimming in New Jersey lakes, including those in WMA 02.

## 5.3 SWQSs and Stream Classifications

As noted in Section 3.1 the New Jersey's Surface Water Quality Standards (N.J.A.C.7:9B) establish the water quality goals and policies underlying the management of the State's water quality. Issues and/or concerns in a given stream reach occur when SWQS are not met or are threatened. A draft map of the SWQS as they apply to stream classifications in WMA 02 is provided on Figure 3.1-1. In addition, Figure 5.3-1 depicts Stream Classifications overlain on Open Space (i.e., preserved or protected land) and Land Use/Land coverage in WMA 02. Regardless of their Classifications waterways may be impacted by changes in surrounding or/or upstream land uses within each reach.

Table 5.1-1 shows the linear miles and percentage of stream lengths in WMA 02 sub-divided by major land use/land classes. For example, 81 % of FW 1 waters are in areas Classified as Open Space or areas, which are restricted from development. [Note: These analyses are based only on State-Owned Open Space and may not reflect the true range of County and Municipal protected Open Space not accessible in the NJDEP database]. FW1 waters are fresh surface waters that are to be maintained in their natural state and not subjected to man-made wastewater discharges or increases from runoff from anthropogenic activities. FW1 waters in WMA 02 should be managed so as to ensure low probability of pollution sources from current and future landuses. All FW 1 waters are also listed as Nondegradation (ND) waters, which are set aside for posterity because of their clarity, color, scenic setting, and other characteristic of aesthetic value, unique ecological significance, or exceptional water supply significance.

In addition, 98 % of the Trout Production *(*TP) waters (i.e., fresh waters designated for trout spawning or nursery during their first year and 99 % of the Trout Maintenance (TM) waters (i.e., fresh waters designated for the support of trout throughout the year) in WMA 02's are also in preserved open space areas. Table 5.1-1 indicates similar breakdowns for all other Water Classification areas in WMA 02.

## 5.4 Relative Contribution of Point and Nonpoint Sources of Total Phosphorus

Under contract to NJDEP, USGS conducted a study to evaluate the relative contributions of point and nonpoint sources of pollution to freshwater streams. (USGS, 1999) The study included a statistical evaluation of water quality data collected between 1976 and 1993 in the Ambient Stream Monitoring Program at 79 stations. Water quality data for 20 parameters were grouped by samples collected under high and low flow conditions and the relationships between load and flow and concentration and flow was used to indicate the relative contribution of constant sources (i.e., point sources and groundwater inflow) and intermittant sources (i.e., nonpoint and stormwater sources). For this assessment, total phosphorus results from this study were combined with municipal wastewater point source locations and permit limits for total phosphorus (TP).

Figure 4.0-1 shows % exceedences of TP at the four (4) Ambient Stream Monitoring Network stations in WMA 02. See Chapter 3 for additional discussion. Results of the USGS study described above are shown to indicate relative contribution of point and nonpoint sources. The figure also includes known or potential sources of TP in WMA 02, including major and minor municipal discharges, golf courses and land uses. The following assessment is based on this figure and data provided in Chapters 3 and 4.

As shown on Figure 4.0-1, SWQS for TP were met between 1995 and 1997. However, exceedences occurred between 1990 and 1994. Results of the USGS study indicate that constant sources (e.g., point sources and ground water) were relatively more important at the Wallkill River at Sussex monitoring station between 1976 and 1993. As shown on Table A4.1-1 in the appendix, there are 4 municipal point sources discharging to waters above the monitoring station on the Wallkill at Sussex. Of these, 2 facilities (1 major and 1 minor) have effluent limits for TP. Two (2) minor facilities, which will be regionalized into Sussex County MUA in the near future, do not have effluent limits for TP. Major land uses above this monitoring location include urban lands and golf courses. This very preliminary assessment indicates that the current attainment of the SWQS for TP at this monitoring location may be due to the implementation of the effluent limits.

Results of the USGS study indicate that the Papakating Creek at Sussex monitoring station was affected by constant sources between 1976 and 1993. This station exhibited a downward trend in in-stream concentration of TP. The SWQS criterion for total phosphorus exceeded in 31% of samples between 1990 and 1994 and in 21% of samples collected between 1995 and 1997. The downward trend may be attributed to removal of the Sussex Boro facility discharge from Papakating Creek to Sussex County MUA on the Wallkill in 1996. Currently only 1 minor municipal treatment facility above this monitoring station, and land uses are predominantly agriculture and forest. This location may now be affected primarily by nonpoint sources and residual phosphorus in sediments.

Results of the USGS study indicate that the Wallkill River near Unionville monitoring station was affected by both constant and intermittant sources between 1976 and 1993 and the SWQS criterion for total phosphorus was met between 1995 and 1997. Regulated municipal discharges above this monitoring location include the four (4) facilities that discharge to the upper Wallkill River, 1 remaining minor discharge on the Papakating Creek and 1 minor discharge to a lower Wallkill River tributary. Land uses are predominantly agriculture and forest.

Results of the USGS study indicate that the Black Creek at Vernon monitoring station was affected by both constant and intermittant sources between 1976 and 1993 and the SWQS criterion for total phosphorus was met between 1995 and 1997. One minor municipal facility discharges seasonally (during winter months) to Black Creek above the monitoring point. In-stream TP appears higher during summer months. Land uses include wetland, agriculture and urban land.

This very preliminary assessment indicates that the relative contribution of point sources of TP has declined in importance on a WMA basis and that nonpoint sources of TP should be carefully examined. Clearly, a more detailed analysis is needed, including an evaluation of TP loads from regulated facilities and land uses, a review of site-specific studies done by regulated facilities and incorporation of any additional in-stream concentration and load data collected at additional points in WMA02. These additional analyses may be done as TMDLs are planned and developed.

### 5.5 Data and Data Assessment Needs

- Additional data and information are needed to provide a more comprehensive overview of Lake Resources. Data needs include trophic status, management measures at eutrophic lakes and sanitary quality at lake bathing beaches. Recently, NJDEP began working with state, county and local health agencies to compile lake bathing beach data. These data will provide a more direct assessment of recreational uses for swimming in New Jersey lakes, including those in WMA 02.

- Additional investigations and data assessments are needed to evaluate the apparent decline in biological health as indicated by increased benthic macroinvertebrate impairment. Data included in the NJDEP report on stream substrate and bank stability, etc. could be further evaluated. Site specific investigations (e.g., stream walks) that consider locations of storm drains, erosion could be used to identify potential contributor(s) to impairment. Flow assessments may be useful (i.e., large storms prior to sampling, stream flashiness). Water chemistry data collected at or near AMNET sampling locations would also be very useful.

- Chapter 2 discussed the presence in WMA 02 of GIS polygons labeled under the category "extraction mining" (see 2.3.5). This coverage can indicate open pit or below ground mining, either currently active or closed. The precise nature of these locations in WMA 02 would be helpful in assessing their potential as pollution sources, either as mines, pits or as un-permitted landfills.

- The assessment of relative contributions of point and nonpoint sources of total phosphorus provided in this report is very preliminary. Additional assessment should include review of site-specific studies conducted by regulated facilities and a comparison of point source and in-stream loads of TP if sufficient data are available. Also, in-stream TP data collected by other entities should be included in the assessment.